

CLAIM AMENDMENTS

1. (Currently Amended) A semiconductor laser device which emits light at an oscillation wavelength, the laser device comprising: a reflective film constituted of including a multilayer dielectric film, being provided on at least one side of optical exit faces face of a laser chip₅₁, wherein the reflective film includes, in sequence from a side in contact with the laser chip, a first dielectric film of a refractive index n1, a second dielectric film of a refractive index n2, a third dielectric film of a refractive index n3, and a fourth dielectric film of a refractive index n4, and ~~each of refractive indices satisfies a relation: n2 = n4 < n1 < n3.~~

2. (Currently Amended) A semiconductor laser device which emits light at an oscillation wavelength, the laser device comprising: a reflective film constituted of including a multilayer dielectric film, being provided on at least one side of optical exit faces of a laser chip₅₁, wherein the reflective film includes, in sequence from a side in contact with the laser chip, a first dielectric film of a refractive index n1, a second dielectric film of a refractive index n2, a third dielectric film of a refractive index n3, and a fourth dielectric film of a refractive index n4, and ~~each of refractive indices satisfies a relation: n2 = n4 < n3 < n1.~~

3. (Currently Amended) The semiconductor laser device according to Claim 1, wherein each thickness of the first to, second, third, and fourth dielectric films ~~is set up has a thickness, in terms of optical length, within ±30% of range of a thickness of that is an integral integer multiple of 1/4 of the oscillation wavelength of the semiconductor laser device.~~

4. (Currently Amended) The semiconductor laser device according to Claim 2, wherein each thickness of the first to, second, third, and fourth dielectric films ~~is set up has a thickness, in terms of optical length, within ±30% of range of a thickness of that is an integral integer multiple of 1/4 of the oscillation wavelength of the semiconductor laser device.~~

5. (Currently Amended) A semiconductor laser device which emits light of an oscillation wavelength λ , comprising:

~~a reflective film constituted of including a multilayer dielectric film, being provided~~ on at least one side of optical exit faces of a laser chip₅₁, wherein

~~the reflective film having has a reflectance of 3% to 15% and includes, in sequence from a side in contact with the laser chip, a first dielectric film of a refractive index n1 and a thickness d1, a second dielectric film of a refractive index n2 and a thickness d2, a~~

third dielectric film of a refractive index n_3 and a thickness d_3 , and a fourth dielectric film of a refractive index n_4 and a thickness d_4 , ~~and~~

the refractive index n_1 satisfies $1.6 < n_1 \leq 1.9$, the refractive index n_2 satisfies $1.3 \leq n_2 \leq 1.6$, the refractive index n_3 satisfies $1.9 < n_3 \leq 2.3$, and the refractive index n_4 satisfies $1.3 \leq n_4 \leq 1.6$, and

the thickness d_1 is substantially equal to $(2*h + 1)\lambda/(4*n_1)$, the thickness d_2 is substantially equal to $(2*i + 1)\lambda/(4*n_2)$, the thickness d_3 is substantially equal to $(2*j + 1)\lambda/(4*n_3)$, and the thickness d_4 is substantially equal to $(2*k + 1)\lambda/(4*n_4)$, ~~wherein and~~ each of h , i , j , and k is zero or ~~more a positive~~ integer.

6. (Currently Amended) A semiconductor laser device which emits light of an oscillation wavelength λ , the laser device comprising:

~~a reflective film constituted of including a multilayer dielectric film, being provided on at least one side of optical exit faces of a laser chip,~~ wherein

the reflective film ~~having~~ has a reflectance of 3% to 15% and includes, in sequence from a side in contact with the laser chip, a first dielectric film of a refractive index n_1 and a thickness d_1 , a second dielectric film of a refractive index n_2 and a thickness d_2 , a third dielectric film of a refractive index n_3 and a thickness d_3 , and a fourth dielectric film of a refractive index n_4 and a thickness d_4 , ~~and~~

the refractive index n_1 satisfies $1.9 < n_1 \leq 2.3$, the refractive index n_2 satisfies $1.3 \leq n_2 \leq 1.6$, the refractive index n_3 satisfies $1.6 < n_3 \leq 1.9$, and the refractive index n_4 satisfies $1.3 \leq n_4 \leq 1.6$, and

the thickness d_1 is substantially equal to $(2*h + 1)\lambda/(4*n_1)$, the thickness d_2 is substantially equal to $(2*i + 1)\lambda/(4*n_2)$, the thickness d_3 is substantially equal to $(2*j + 1)\lambda/(4*n_3)$, and the thickness d_4 is substantially equal to $(2*k + 1)\lambda/(4*n_4)$, ~~wherein~~ each of h , i , j , and k is zero or ~~more a positive~~ integer.

7. (Currently Amended) The semiconductor laser device according to Claim 1, wherein the first dielectric film is ~~formed of either selected from the group consisting of~~ Al_2O_3 , CeF_3 , NdF_3 , MgO , and Y_2O_3 , the second and fourth dielectric films are ~~formed of either selected from the group consisting of~~ SiO_2 , MgF_2 , BaF_2 , and CaF_2 , and the third dielectric film is ~~formed of either selected from the group consisting of~~ Ta_2O_5 , SiO , ZrO_2 , ZnO , TiO_2 , ZnS , Nb_2O_5 , HfO_2 , and AlN .

8. (Currently Amended) The semiconductor laser device according to Claim 5, wherein the first dielectric film is ~~formed of either selected from the group consisting of~~ Al₂O₃, CeF₃, NdF₃, MgO₂ and Y₂O₃, the second and fourth dielectric films are ~~formed of either selected from the group consisting of~~ SiO₂, MgF₂, BaF₂, and CaF₂, and the third dielectric film is ~~formed of either selected from the group consisting of~~ Ta₂O₅, SiO, ZrO₂, ZnO, TiO, TiO₂, ZnS, Nb₂O₅, HfO₂, and AlN.

9. (Currently Amended) The semiconductor laser device according to Claim 2, wherein the first dielectric film is ~~formed of either selected from the group consisting of~~ Ta₂O₅, SiO, ZrO₂, ZnO, TiO, TiO₂, ZnS, Nb₂O₅, HfO₂, and AlN, the second and fourth dielectric films are ~~formed of either selected from the group consisting of~~ SiO₂, MgF₂, BaF₂, and CaF₂, and the third dielectric film is ~~formed of either selected from the group consisting of~~ Al₂O₃, CeF₃, NdF₃, MgO₂ and Y₂O₃.

10. (Currently Amended) The semiconductor laser device according to Claim 6, wherein the first dielectric film is ~~formed of either selected from the group consisting of~~ Ta₂O₅, SiO, ZrO₂, ZnO, TiO, TiO₂, ZnS, Nb₂O₅, HfO₂, and AlN, the second and fourth dielectric films are ~~formed of either selected from the group consisting of~~ SiO₂, MgF₂, BaF₂, and CaF₂, and the third dielectric film is ~~formed of either selected from the group consisting of~~ Al₂O₃, CeF₃, NdF₃, MgO₂ and Y₂O₃.

11. (Currently Amended) The semiconductor laser device according to Claim 1, ~~wherein a multilayer dielectric film in combination with including~~ a fifth dielectric film and a sixth dielectric film ~~is additionally formed~~ in a region other than a light emitting point on the optical exit faces of the laser chip, and a reflectance of the region other than the light emitting point is smaller than a reflectance of the region of the light emitting point.

12. (Currently Amended) The semiconductor laser device according to Claim 2, ~~wherein a multilayer dielectric film in combination with including~~ a fifth dielectric film and a sixth dielectric film ~~is additionally formed~~ in a region other than a light emitting point on the optical exit faces of the laser chip, and a reflectance of the region other than the light emitting point is smaller than a reflectance of the region of the light emitting point.

13. (Currently Amended) The semiconductor laser device according to Claim 11, wherein each ~~thickness~~ of the fifth and sixth dielectric films ~~is set up has a thickness~~, in terms

of optical length, within $\pm 30\%$ of range of ~~a thickness of~~ an integral multiple of $1/4$ of the oscillation wavelength of the semiconductor laser device.

14. (Currently Amended) The semiconductor laser device according to Claim 12, wherein each ~~thickness~~ of the fifth and sixth dielectric films ~~is set up has a thickness~~, in terms of optical length, within $\pm 30\%$ of range of ~~a thickness of~~ an integral multiple of $1/4$ of the oscillation wavelength of the semiconductor laser device.

15. (Currently Amended) The semiconductor laser device according to Claim 13, wherein the fifth dielectric film is ~~formed of either selected from the group consisting of~~ Al₂O₃, CeF₃, NdF₃, MgO₁ and Y₂O₃, and the sixth dielectric film is ~~formed of either selected from the group consisting of~~ SiO₂, MgF₂, BaF₂, and CaF₂.

16. (Currently Amended) The semiconductor laser device according to Claim 14, wherein the fifth dielectric film is ~~formed of either selected from the group consisting of~~ Al₂O₃, CeF₃, NdF₃, MgO₁ and Y₂O₃, and the sixth dielectric film is ~~formed of either selected from the group consisting of~~ SiO₂, MgF₂, BaF₂, and CaF₂.

17. (Currently Amended) The semiconductor laser device according to Claim 1, wherein the laser chip has a plurality of light emitting points which emit at least two or more different oscillation wavelengths.

18. (Currently Amended) The semiconductor laser device according to Claim 2, wherein the laser chip has a plurality of light emitting points which emit at least two or more different oscillation wavelengths.

19. (Currently Amended) The semiconductor laser device according to Claim 1, ~~wherein including at least two or more of the semiconductor laser devices are arranged in a single package, and each of wherein the laser chip emits chips emit different oscillation wavelength from each other wavelengths~~, and each of multilayer dielectric film on the optical exit face of each laser chip is ~~formed of~~ the same material with the same thickness.

20. (Currently Amended) The semiconductor laser device according to Claim 2, ~~wherein including at least two or more of the semiconductor laser devices are arranged in a single package, and each of wherein the laser chip emits chips emit different oscillation~~

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~~wavelength from each other~~ wavelengths, and each of multilayer dielectric film on the optical exit face of each laser chip is ~~formed~~ of the same material with the same thickness.